

REMARKS/ARGUMENTS

Claims 1-22 were pending. Claim 19 has been canceled, and claims 23-54 have been added. Hence, claims 1-18 and 20-54 are now pending.

In this Action, the Examiner objected to claims 19-20 under 35 U.S.C. §112, second paragraph, for indefiniteness. In response, applicant has canceled claim 19 and substituted therefor new claims 23-37, has amended claim 21, and has added new claims 38-54. Withdrawal of the objection to the claims as amended is therefore respectfully requested.

The Examiner rejected claims 19 and 21-22 under 35 U.S.C. §101 because the invention is directed to non-statutory subject matter. Since claim 19 has been canceled, the rejection is moot with respect thereto. Applicant respectfully traverses this rejection with respect to claims 21-22.

Claims 21 and 22 are written in means-plus-function form. The Examiner asserted that "the 'means for' does not necessarily indicate statutory subject matter. The 'means for' could simply be a software application, and there is no recitation of the structure of the apparatus in the specification that would require the 'apparatus' or 'means for' to be a piece of hardware". Applicant respectfully asserts that the Examiner is mistaken.

35 U.S.C. §112, sixth paragraph, explicitly sanctions means-plus-function claims that recite no hardware. "An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof..." 35 U.S.C. §112, sixth paragraph (emphasis added). Therefore, requiring applicant to positively recite hardware in the claims is improper.

Means-plus-function claims must be interpreted in light of the specification to cover the corresponding structure disclosed in the specification and equivalents thereof. "[S]uch claims shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." Id The specification clearly discloses corresponding structure in the form of a memory 110 that stores programs 112, 124 and data 120, and a processor 112 that executes the programs therefrom in order to effect the functionality recited in the claims. See Fig. 1, page 5, lines 17-22, and page

5, line 31, to page 6, line 2. Thus, the specification clearly and explicitly discloses structure that corresponds to the means recited in the claims.

Moreover, the specification makes it clear that it is the execution of programs 112 and 124 that performs the functions recited by the claims – see, e.g., page 6, lines 17-19. Programs cannot execute in the absence of something to execute them on and that provides them for execution. Memory 110 and processor 112 are thus an integral part of the means recited in the claims, and the claims cannot be read on the programs alone.

The Examiner further asserted that “on page 4 of Applicant’s specification, the apparatus is specified as including an ‘effector’, distinct from ‘means’. This effector could simply be a piece of software.” While that may be true, the Examiner fails to appreciate that applicant makes a clear distinction between an “effector” and a “means” and explicitly states that an “effector” is “unlike a means” (emphasis added). The rejected claims explicitly recite “means” for each element, not an “effector”. So the fact that an “effector could simply be a piece of software” has no bearing on whether or not the “means” could simply be a piece of software.

For the reasons give above, applicant respectfully asserts that the Section 101 rejection of his claims 21-22 is not well founded, and he requests that it be withdrawn.

The Examiner next rejected claims 1-13, 15-16, and 18-22 under 35 U.S.C. §103(a) over Kalavade et al. (US patent no. 6,393,433). This rejection is respectfully traversed.

In explaining this rejection, the Examiner merely repeated the previous 35 U.S.C. §102(e) rejection based on Kalavade et al. which applicant had successfully overcome. Applicant had shown that the only similarity between Kalavade et al. and his claimed invention is that both make predictions based on probabilities, and hence use statistical methods. But the Examiner dismissed this showing as unimportant, stating: “There are some noted differences between the precise claim language and the disclosure of Kalavade. Particularly, the claim recites computing a probability that a plurality of resources will be available in the future, while Kalavade discusses computing the probability of a task completing before its deadline expires. Essentially, the calculation of whether a

task will complete before a particular deadline can be considered in similar terms as the task yielding the resource at a particular point in time. The probability that the task will complete is the same as the probability of the resource being available, as the resource is only occupied as long as a task executes." Office Action mailed on June 7, 2005, page 5, paragraph 9. Let us assume that the Examiner is correct so far. The Examiner continued, stating that "Kalavade uses the statistical analysis as an admission control technique, only allowing tasks to be scheduled if the task's probable completion time satisfies the scheduling policy. By computing the probability of a task completing by its deadline, the scheduler knows with greater certainty whether another task with a hard deadline can reasonably be scheduled on that resource." Id. The Examiner is mistaken.

Kalavade et al. do not use the probability that a task completes before its deadline as an admission policy for scheduling tasks. In Kalavade et al., any of the scheduling policies being evaluated schedule a new task only when a previous task has actually completed its execution, irrespective of whether that completion occurs before, at, or after the deadline. The scheduling of new tasks is not based on task-completion probabilities, but an actual task completion. Kalavade et al. only use the probability that a task completes its execution by its deadline to evaluate the performance of different scheduling policies. This bears no relation to applicant's invention, which uses task-completion probabilities as a scheduling policy.

This fundamental difference in what Kalavade et al. and applicant's invention accomplish is reflected in the claims. Applicant's claims recite determining a probability of availability of each of a plurality of resources at a future point in time. In other words, the claimed invention computes the probabilities of multiple resources being available at the same one future point. In contrast, Kalavade et al. compute the probability of each task completing (i.e., the probability of each resource being available, by the Examiner's analogy) at that task's own deadline, not at a common future point in time. Hence, Kalavade et al. do not disclose, teach, or suggest this claim element.

The claims further recite combining the determined probabilities to obtain a number. Since Kalavade et al. do not compute the probabilities of multiple tasks completing at a given point in time, Kalavade et al. cannot combine these

(non-existent) probabilities. Moreover, Kalavade et al. do not even disclose combining the probabilities which they do compute (i.e., the probabilities of tasks completing by their respective deadlines). Hence, Kalavade et al. do not disclose, teach, or suggest this claim element either.

But even if one were to assume that Kalavade et al. do combine the probabilities of multiple tasks completing by their respective deadlines as a part of evaluating different scheduling policies, this would not render the claimed invention unpatentable, for the following reasons. Firstly, because these probabilities are different from the probabilities combined by applicant, as was discussed above. Secondly, because – as recited in the claims – applicant uses the number obtained by combining the probabilities to schedule new tasks for that given future point in time, while Kalavade et al. use the probabilities not for scheduling, but merely to evaluate the performance of different scheduling policies. In other words, Kalavade, et al. do not disclose, teach, or suggest this last claim element either.

As this expanded discussion of the disclosure of Kalavade et al. vis-à-vis the recitations of applicant's claims shows, the distinctions drawn by applicant between Kalavade et al. and his claims in response to the previous Office Action hold true, and applicant continues to stand by them. In short, applicant continues to assert that Kalavade et al. do not disclose any of the elements of his claims, and hence do not render these claims unpatentable. Applicant therefore requests that the Section 103(a) rejection of his claims over Kalavade et al. be withdrawn.

The Examiner also repeated his previous rejection of claims 14 and 17 under 35 U.S.C. §103(a) over Kalavade et al. in view of Pena-Nieves et al. (US patent no. 6,816,798). Applicant continues to traverse this rejection for the same reasons as stated in his response to the previous rejection. Applicant therefore requests that this rejection also be withdrawn.

The Examiner's objections and rejections having been properly addressed and disposed of, applicant asserts that the application is now in condition for allowance. Applicant therefore requests that the application be reconsidered and thereafter be passed to issue.

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Amdt. Dated 8 July 2005

Reply to Office Action of June 7, 2005

Applicant believes that the foregoing is dispositive of all issues in the application. But, if the Examiner should deem that a telephone interview would advance prosecution, applicant requests the Examiner to call applicant's attorney at the telephone number listed below.

Respectfully submitted,

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